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Eddie E Scott Patent Attorney Lawrence Livermore National Lab PP Box 808-L-703 Livermore, CA 94551			MONBLEAU, DAVIENNE N	
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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Paper No. 030204

Application Number: 09/661,653

Filing Date: September 14, 2000

Appellant(s): AULT, EARL R

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Eddie E. Scott  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 2/19/04.

**(1) *Real Party in Interest***

A statement identifying the real party in interest is contained in the brief.

**(2) *Related Appeals and Interferences***

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

**(3) *Status of Claims***

The statement of the status of the claims contained in the brief is correct.

**(4) *Status of Amendments After Final***

No amendment after final has been filed.

**(5) *Summary of Invention***

The summary of invention contained in the brief is correct.

**(6) *Issues***

The appellant's statement of the issues in the brief is correct.

**(7) *Grouping of Claims***

Examiner agrees with Appellant's grouping of claims and the reason set forth in the brief.

**(8) *ClaimsAppealed***

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(9) *Prior Art of Record***

3,663,891	Kocher et al.	05-1972
4,654,855	Chun	03-1987
5,307,358	Scheps	04-1994

**(10)    *Grounds of Rejection***

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3-5 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kocher et al. (US 3,663,891) in view of Chun (US 4,654,855) and Scheps (US 5,307,358).  
Regarding Claim 1, *Kocher* teach in Figure 1 a laser comprising a first lasing chamber/cell (12), a pumping device (22), a liquid active material, and a closed loop circulation system with a first portion to circulate said liquid into and out of said first lasing chamber (12). *Kocher* does not teach a second lasing chamber. *Chun* teaches in Figure 1A a gas laser circulation system with two chambers (4). Since a gas is a flowing liquid, it would have been obvious to one of ordinary skill in the art at the time of the invention to use two chambers in *Kocher*, as taught by *Chun*, to provide continuous and efficient lasing activity. Furthermore, incorporating a second lasing chamber with the same overall configuration as the first lasing chamber is mere duplication of parts of the essential working parts of device, which has been held to involve routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8. *Chun* further teaches in Figure 1A a closed loop circulation system with a first linear circulation path through said first lasing chamber and a second linear circulation path through said second lasing chamber, wherein said second linear circulation path is opposite in direction to said first linear circulation path. *Chun* also teaches in

Figure 1A a first circulating portion for said first lasing chamber and a second circulating portion for said second lasing chamber. (See *Chun* Figure 1A below). *Kocher* does not teach trivalent titanium ions dissolved in a liquid host. *Scheps* teaches in Figure 2 a laser system comprising a gain medium (11) doped with trivalent titanium ions and further teaches in column 12 lines 2-5 that said gain medium might be a liquid. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the trivalent titanium ions dissolved in a liquid host in *Kocher*, as taught by *Scheps*, to produce a laser output with a specific wavelength. It is known in the art that the wavelength range over which the laser system operates is determined by the dopant(s) used in the laser gain medium and the pumping energy. (See *Scheps* column 5 line 66-68). *Kocher* does not teach that said pump source (22) is a semiconductor diode. *Scheps* teaches in Figure 2 that said pump source (12) may be a semiconductor diode. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a diode pump source in *Kocher*, as taught by *Scheps*, since choosing optimum pumping device involves routine skill in the art. Optical pumping sources (laser diodes and semiconductors lasers) are standard in the art.

Regarding Claim 3, *Kocher* teaches a pump (24) and a heat exchanger (26).

Regarding Claim 4, *Kocher* teaches in columns 1-3 that said circulation system prevents optical distortion from thermal effects. Also, the Appellant states in the specification on page 16 lines 1-7 that these features for reducing the thermal effect are known in the art.

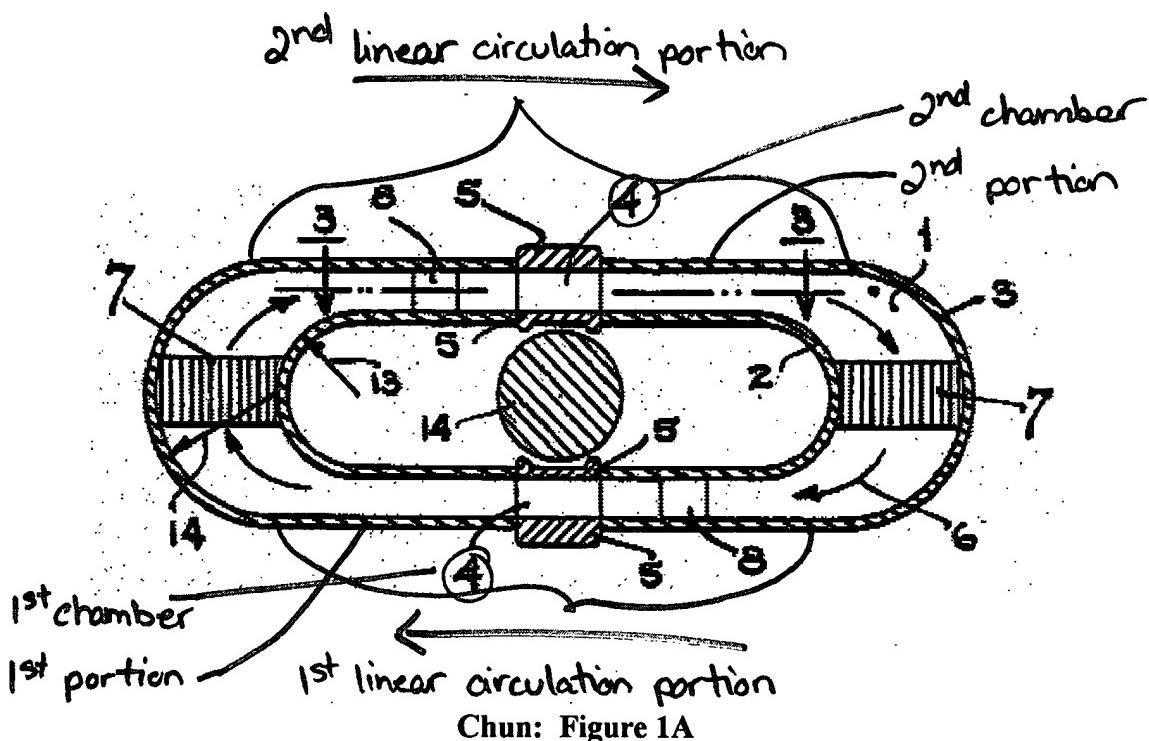
Regarding Claim 5, see discussions on Claims 1 and 4. Furthermore, *Chun* teaches in Figure 1A that said first and second portions have substantially equal length.

Regarding Claim 9, *Kocher* teach in Figure 1 a laser comprising a first lasing chamber/cell (12), a pumping device (22), a liquid active material, and a closed loop circulation

system with a first portion to circulate said liquid into and out of said first lasing chamber (12).

*Kocher* does not teach a second lasing chamber. *Chun* teaches in Figure 1A a gas laser circulation system with two chambers (4). For purposes of this area of art (active medium circulation system), a gas is a flowing liquid. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use two chambers in *Kocher*, as taught by *Chun*, to provide for continuous and efficient lasing activity. Furthermore, incorporating a second lasing chamber with the same overall configuration as the first lasing chamber is mere duplication of parts of the essential working parts of device, which has been held to involve routine skill in the art. St. Regis Paper Co. v. Bemis Co., 193 USPQ 8. *Chun* further teaches in Figure 1A a first circulating portion for said first lasing chamber and a second circulating portion for said second lasing chamber. (See *Chun* Figure 1A below). *Kocher* does not teach trivalent titanium ions dissolved in a liquid host. *Scheps* teaches in Figure 2 a laser system comprising a gain medium (11) doped with trivalent titanium ions and further teaches in column 12 lines 2-5 that said gain medium might be a liquid. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the trivalent titanium ions dissolved in a liquid host in *Kocher*, as taught by *Scheps*, to produce a laser output with a specific wavelength. It is known in the art that the wavelength range over which the laser system operates is determined by the dopant(s) used in the laser gain medium and the pumping energy. (See *Scheps* column 5 line 66-68). *Kocher* does not teach that said pump source (22) is a semiconductor diode. *Scheps* teaches in Figure 2 that said pump source (12) may be a semiconductor diode. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a diode pump source in *Kocher*, as taught by *Scheps*, since choosing optimum pumping device involves routine skill in

the art. Furthermore, optical pumping sources, such as laser diodes and semiconductors lasers are standard in the art.



#### **(11) Response to Argument**

A. Appellant's argument that the cited prior art of reference does not show a closed loop circulation system that circulates the trivalent titanium liquid through said first lasing chamber in a first direction and through said second lasing chamber in a second direction that is opposite to said first direction has been carefully considered but is not persuasive. Both *Kocher* and *Chun* read on a closed loop circulation system for a laser. Such circulation systems are applicable to either liquid or gas lasers. (A gas may be viewed as a liquid). Thus, although *Kocher* reads more specifically on a liquid laser and *Chun* reads more specifically on a gas laser, for these purposes they are analogous art. As depicted in Figure 1A above, *Chun* teaches the claimed circulation system.

**B.** Appellant's argument that the cited prior art of record does not show a system for correcting thermally induced optical phase errors has been carefully considered but is not persuasive. Appellant argues that although *Kocher* identifies the problem of optical distortion, they teach a different solution than defined by the Appellant. However, *Kocher* in view of *Chun* teach the Appellant's claimed structural solution of a closed loop circulation system with a first portion for circulating the liquid into and out of said lasing chamber in a first direction and said second portion for circulating said liquid into and out of said lasing chamber in a second direction that is opposite to said first direction. Thus, since the structure is the same, it functions in the same manner, which includes correcting said thermally induced optical phase errors.

**C.** Appellant's argument that the cited prior art of record does not show trivalent titanium ions dissolved in a liquid host has been carefully considered but is not persuasive.

First, Appellant argues that *Scheps* does not show enablement of a liquid laser because it does not teach an embodiment with a liquid. *Scheps* teaches using a liquid gain medium, which is a liquid laser (column 8 lines 55-62).

Second, Appellant argues that *Scheps*' "liquid prism" is not a circulating liquid host. However, *Scheps* is not used to teach that claim limitation so this point is moot.

Lastly, Appellant argues that *Scheps*' "liquid prism" does not describe having trivalent titanium ions dissolved therein. *Scheps* teaches that it is known in the art that the wavelength range over which the laser system operates is determined by the dopant(s) used in the laser gain medium (column 5 lines 66-68). *Scheps* also teaches that titanium ions may be used as a dopant to obtain a particular output wavelength (column 6 lines 3-6) and that a liquid with a dissolved solute serves the same function as doping a solid-state gain material (column 9 lines 8-19).

Thus, *Scheps* teaches that one of ordinary skill in the art may choose to use a trivalent titanium dissolved in a liquid host in order to produce a particular output wavelength range.

**D.** Appellant's argument that the cited prior art of record does not show an obvious combination of claim elements as defined by the Appellant's claims has been carefully considered but is not persuasive.

First, Appellant argues that there is "no suggestion or motivation in the prior art to combine" the *Kocher*, *Chun*, and *Scheps* in the references themselves. However, MPEP §2143.01 that obviousness can also be established when there is some teach, suggestion, or motivation to do so "in the knowledge generally available to one of ordinary skill in the art. The motivation to combine *Kocher* and *Chun*, is to provide continuous and efficient lasing activity. Furthermore, incorporating a second lasing chamber with the same overall configuration as the first lasing chamber is mere duplication of parts of the essential working parts of device, which has been held to involve routine skill in the art. St. Regis Paper Co. v. Bemis Co., 193 USPQ 8. The motivation to combine *Kocher* and *Scheps* is to produce a laser output with a specific wavelength. It is known in the art that the wavelength range over which a laser system operates is determined by the dopant(s) used in the laser gain medium (*Scheps* column 5 lines 66-68).

Second, Appellant argues that there is no reasonable expectation of success of the claimed combination. Both *Kocher* and *Chun* read on a closed loop circulation system for a laser. Such circulation systems are applicable to either liquid or gas lasers. (A gas may be viewed as a liquid). Thus, although *Kocher* reads more specifically on a liquid laser and *Chun* reads more specifically on a gas laser, for these purposes they are analogous art. *Scheps* is combined to teach that it is known in the art that the wavelength range over which the laser

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system operates is determined by the dopant(s) used in the laser gain medium. This is applicable to any laser system. Thus, the combinations have a reasonable expectation of success.

Lastly, Appellant argues that only through impermissible hindsight would motivation be found to combine said references. It must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the Appellant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Danielle Montbleau

DNM  
March 5, 2004

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